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UNDERFLOOR MOISTURE-PROOF CONSTRUCTION METHOD
[TOKOSHITA HOSHITSU KOHO]

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Specification

1. Title of the invention

Underfloor Moisture-Proof Construction Method

2. Scope of Claims

1. An underfloor moisture-proof construction method, characterized by the fact that the underfloor ground surface of a building is treated with a termite preventing agent and then paved by naturally fluidizing a self-flowable hydraulic composition in which water-reducing admixture, water retainer, aggregate, and water are mixed with hydraulic cement.

3. Detailed description of the invention

(Industrial application field)

The present invention pertains to an underfloor moisture-proof construction method for obtaining moisture prevention and termite prevention effects under the floor of a building.

[1] Numbers in the margin indicate pagination in the foreign text.

(Prior art)

In general, moisture is a formidable foe to buildings. In particular, if moisture under the floor of a building increases, the possibility of generating Namida [transliteration] mushrooms as a kind of rot bacterium in underfloor wood parts or floor plate parts is raised. These Namida mushrooms like moisture, spread on the wood parts of houses, especially on the floor plates, and rot them. In addition, a dark place under the floor, where the ventilation is poor, the temperature is warm, the moisture is high, is an optimum proliferation environment for white ants. Since the white ants harmfully eat wood in a wet state, the wood parts of ground sills and pillars in buildings become favorable foods for the white ants. The damage of these Namida mushrooms and white ants is severe, and the ground sill parts of buildings are corroded without being aware of it, so that the buildings cannot be repaired or collapsed, causing a social problem.

Accordingly, as an underfloor moisture prevention measure for buildings, a method that places a polyethylene sheet on the ground surface under the floor or places a concrete on the ground under the floor has been employed. In the above-mentioned method that places a polyethylene sheet, though the moisture prevention effect of space parts

under the floor is recognized, the ground surface includes water and cannot discharge the water to the outside, causing high moisture. In addition, in the concrete placing method, although the moisture prevention effect is recognized, compared with untreated soils, fissure cracks are generated by the contraction when the concrete is hardened, or gaps are generated in the contact parts with the foundation, binding stones, etc. It is thus difficult to call this method a complete construction method.

On the other hand, as an underfloor white ant prevention measure, generally, control chemicals are infiltrated into the inside and outside of foundations and the periphery of binding stones or the entire surface of the underfloor ground, or a soil treatment that mixes

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control chemicals with soils is applied. Moreover, a method that treats woods by immersing, spreading, spraying, or boring and injecting control chemicals is also applied to wood foundations. However, in this method, it is difficult to obtain an underfloor moisture prevention effect.

(Problems to be solved by the invention)

The present invention is based on the above-mentioned situation, and its purpose is to provide an underfloor

moisture-proof construction method that reinforces the control of damages from termites by improving the underfloor moisture prevention effect.

(Means to solve the problems)

The purpose of the present invention is achieved by an underfloor moisture-proof construction method characterized by the fact that a hydraulic composition with excellent flowability having a specific mixture is naturally fluidized on an underfloor ground surface, to which a soil treatment with control chemicals has been applied, and then paved.

The hydraulic composition with excellent flowability in the present invention is a composition comprised of hydraulic cement, water-reducing admixture, water retainer, aggregate, and water. This hydraulic composition has excellent workability at the time of construction, and the paved hardened body also has little contraction and has a smooth, finished surface without generating fissure cracks.

Next, the present invention will be explained in detail.

As the hydraulic cement being used in the present invention, for example, Portland cement, Portland blast furnace slag cement, silica cement, fly-ash cement, etc. are mentioned.

The water-reducing admixture is added to raise the workability by rendering flowability without increasing the amount of kneading water and to reduce the drying contraction after hardening. In the present invention, water-reducing admixtures that are used in cement mortar or concrete are usually used. For example, olefin-unsaturated carboxylic acid copolymer salt, naphthalene sulfonate-formalin condensate, melamine sulfonate-formalin condensate, polyalkyl allyl sulfonate, lignin sulfonate, etc. are mentioned, and among them, olefin-unsaturated carboxylic acid copolymer salt and melamine sulfonate-formalin condensate are especially preferable. These water-reducing admixtures are used alone or in combinations of two kinds or more.

The amount of addition of the water-reducing admixture is usually 0.05 ~ 5 parts by weight, preferably 0.1 ~ 2 parts by weight to the hydraulic cement at 100 parts by weight, and as the amount increases, the flowability tends to be increased. However, if the amount is too excessive, it does not contribute to the flowability increase, having a negative influence on the hydration and hardenability of the composition.

In the present invention, the water retainer is an essential component along with the water-reducing

admixture. The water retainer is used to suppress the evaporation of kneading water and the absorption of water into the underfloor ground and to prevent the aggregate separation and bleeding of a composition water slurry. As its detailed examples, cellulose derivatives such as methyl cellulose, hydroxyethyl cellulose, hydroxypropylmethyl cellulose, glyoxal-added hydroxypropylmethyl cellulose, and carboxymethyl cellulose, water-soluble high-molecular substances such as polyacrylamide, polyethylene oxide, and sodium polyacrylate, etc. are mentioned. Among them, cellulose derivatives are preferable. These water retainers are used alone or in combinations of two kinds or more. The range of the amount of addition for obtaining a satisfactory effect depends on the kind of water retainer; however, the amount is preferably 0.01 ~ 2 parts by weight to the hydraulic cement at 100 parts by weight.

The hydraulic composition with flowability being used in the present invention is obtained by using the above-mentioned water-reducing admixture and water retainer together with cement mortar. With the use of these two kinds of additives, a multiplication effect is exerted; the flowability of the hydraulic flowable composition is surprisingly markedly improved, the work efficiency is

greatly raised, and cracks or flaws are not generated after hardening.

As the aggregate being used in the present invention, silica, river sand, sea sand, mountain sand, crushed sand, lightweight aggregates, etc. can be used. Generally, the aggregate is added to improve the size stability or to reduce the cost, and its amount of addition is preferably 50 ~ 300 parts by weight to the hydraulic cement at 100 parts by weight. If the amount of addition of the aggregate is too large, the flowability of the composition water slurry is negatively affected, and the workability at the time of construction is lowered. On the other hand, if the amount of aggregate is small, the flowability of the composition water slurry is improved, but fissure cracks are apt be generated after hardening.

It is necessary for the hydraulic flowable composition

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of the present invention to be formed in a slurry state by mixing water to the degree that self-flowability is exhibited. The amount of water mixed in is not necessarily constant in accordance with the mixture, but the amount can be appropriately determined by a simple preliminary test.

In the present invention, since this self-flowable material is used, a uniform and smooth horizontal surface

can be formed simply by casting the material on an underfloor ground surface of a building, and an underfloor moisture-proof construction can be carried out in a short time. In addition, with the multiplication effect of the water-reducing admixture and the water retainer, since a hydraulic flowable composition having good self-flowability can be obtained by a small amount of kneading water, there is no generation of cracks or flaws after hardening, and the strength of the hardened product is also high.

A water slurry of this hydraulic flowable composition can be easily prepared simply by premixing each component and kneading the mixture with water in a construction field. Moreover, each component may also be added when the slurry is prepared.

In the hydraulic flowable composition of the present invention, if necessary, an antifoaming agent, a hardening adjustor, an antifreezing agent, filler, a waterproof agent, colorant, etc. can also be further appropriately mixed.

The moisture-proof construction method using the hydraulic composition water slurry with excellent flowability of the present invention will be mentioned as follows. First, a wood treatment through immersion, spread, spray, boring and injection, etc. is applied to the

wood foundation of a building to be constructed. In addition, a control chemical is infiltrated into the underfloor ground or a soil treatment, such as a mixture with soils, is applied to the underfloor ground. Next, the hydraulic composition water slurry with excellent flowability of the present invention is cast on the underfloor ground surface and is naturally fluidized, and, if necessary, a horizontal floor surface is formed by leveling using a flyer, etc. The composition slurry of the present invention is usually hardened on the next day of the construction, and walking on it is possible. Moreover, since the expansion and contraction of the volume after hardening is small, the size stability is excellent, and there is no generation of cracks. A control chemical can also be added to the hydraulic composition with excellent flowability of the present invention. Next, the present invention will be explained in further detail by application examples; however, the present invention is not limited to the following application examples unless its essence is deviated.

Application Examples 1 ~ 3 and Comparative Examples 1 ~ 3

Hydraulic compositions prepared with mixtures shown in Table 1 were cast at a thickness of 3 cm on the entire

underfloor surface of a building, to which a termite control treatment had been applied, and then paved. Next, the state after a lapse of 3 years was observed. The results are shown in Table 2.

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Table 1

成分	品名	実施例 1	実施例 2	実施例 3	比較例 1	比較例 2
水硬性セメント	普通ポルトランドセメント(a)	100	—	〃	100	100
	高炉セメント B種(b)	〃	100	—	〃	〃
	フライアッシュセメント B種(b)	〃	—	100	—	—
減水剤	タイフロー540(c)	0.3	—	0.3	—	—
	メルメントF-10(d)	〃	1.0	〃	—	〃
保水剤	ヒメトローズ90SH-15000(e)	0.1	0.1	0.1	—	—
骨材	6号砕砂(f)	100	100	100	100	100
水		50	50	50	50	70

（単位 重量部）

(a)，(b) 日本セメント製

(c) C_6モノオレフィン－無水マレイン酸共重合体塩，日本セオン製製品名

(d) メラミンスルホン酸塩－ホルマリン縮合物，昭和電工製 製品名

(e) ヒドロキシプロピルメチルセルロース，信越化学工業製 製品名

(f) 由形産

[Top row, left to right]: Component, Name of product, Application Example, Comparative Example

[“Component” column, top to bottom]:

Hydraulic cement

Water-reducing admixture

Water retainer

Aggregate

Water

["Name of Product" column, top to bottom]:

Ordinary Portland cement(1)

Portland blast furnace slag cement(2)

Fly-ash cement B kind(3)

Quinflow 540(4)

Merment F-10(5)

hi Metrose 90SH-15000(6)

No. 6 silica(7)

[Below table, in parentheses]: (Unit: part by weight)

(1), (2), (3): Made by Nippon Zeon Co., Ltd.

(4): C_5 monoolefin-maleic anhydride copolymer salt, trade name made by Nippon Zeon Co., Ltd.

(5): Melamine sulfonate-formalin condensate, trade name made by Showa Denko K.K.

(6): Hydroxypropylmethyl cellulose, trade name made by Shin-Etsu Chemical Co., Ltd.

(7): Sankeisan

Table 2

性能	実施例			比較例		
	1	2	3	1	2	3
作業性	良好	良好	良好	流動性が低いため悪い	骨材分離のため悪い	
硬化後の状態	良好 ひび割れの発生なし	良好 ひび割れの発生なし	良好 ひび割れの発生なし	不良 床下地盤に水分が吸収されるため、硬化不良で、ひび割れの発生がみられる。	不良 床下地盤に水分が吸収されるため、硬化不良で、ひび割れの発生がみられる。	
防湿効果	良好 3年間にわたりシロアリの害を受けない。 木部基礎に腐食は見られない。	良好 3年間にわたりシロアリの害を受けない。 木部基礎に腐食は見られない。	良好 3年間にわたりシロアリの害を受けない。 木部基礎に腐食は見られない。	不良 木部基礎に多数の腐食がみられる。	不良 木部基礎に多数の腐食がみられる。	不良 木部基礎に多数の腐食がみられる。

[Top row, left to right]: Performance, Application Example, Comparative Example

["Performance" column, top to bottom]:

Workability

State after hardening

Moisture prevention effect

["Workability" row, left to right]:

Good; Good; Good; Poor due to low flowability; Poor due to aggregate separation

["State after hardening" row, left to right]: Good, no generation of fissure cracks; Good, no generation of fissure cracks; Good, no generation of fissure cracks; Poor, since water is absorbed in the underfloor ground, hardening is poor, and the generation of fissure cracks is

seen; Poor, since water is absorbed in the underfloor ground, hardening is poor, and the generation of fissure cracks is seen

[“Moisture prevention effect” row, left to right]: Good, there is no damage of termites for 3 years, no corrosion is seen in the wood foundation; Good, there is no damage of termites for 3 years, no corrosion is seen in the wood foundation; Good, there is no damage of termites for 3 years, no corrosion is seen in the wood foundation; Poor, much corrosion is seen in the wood foundation; Poor, much corrosion is seen in the wood foundation; Poor, much corrosion is seen in the wood foundation

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The buildings of Application Examples 1, 2, and 3 were not subjected to the damage of termites over a long period. In addition, the floor surface had no fissure cracks and was well dried, and there was also no generation of Namida mushrooms. On the other hand, in Comparative Example 1, since the flowability of the hydraulic composition is poor, there was a problem in the workability during the construction. Moreover, since water of the composition water slurry was absorbed in the underfloor ground surface, many fissure cracks were generated after hardening. For this reason, the underfloor moisture prevention effect was

also insufficient. In Comparative Example 2, the flowability of the composition water slurry was improved by increasing the amount of kneading water; however, since the aggregate separation was severe, the workability during the construction was poor. Furthermore, after hardening, fissure cracks were generated similarly to Comparative Example 1, and the moisture prevention effect was also insufficient. In Comparative Example 3, only the termite control treatment was applied, and the underfloor moisture-proof construction method of the present invention was not applied. However, much corrosion of the wood foundation due to high moisture under the floor of the building was observed.

As seen from the above results, it is understood that the underfloor moisture-proof construction method of the present invention is easily applied to construction, raises moisture prevention and termite prevention effects under the floor of a building, and has an effect of improving the damage prevention of a building due to moisture and the residence characteristic.